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User Finds COBOL On VAX Offers More Than Performance

High performance is only the first advantage of VAX-11 COBOL-74, according to one of the first users of the new native-mode compiler.

"I'm familiar with the COBOL and SORT performance of an IBM 370/148. Our VAX system competes very effectively with it," Earl Hadley says. He is analyst of system technology at TRT Telecommunications in Fort Lauderdale, Fla.

It's the combination of high throughput, interactive program development tools, and large-scale program capacity that is most impressive about COBOL on VAX, Hadley says.

For instance, TRT's COBOL systems on VAX are comparable, in run times, to those on an IBM 370/148.

VAX COBOL programs can call the entire range of VAX/VMS system services, which can boost system throughput and enable VAX-11 COBOL programs to do things COBOL programs usually can't.

The VAX/VMS mailbox service, for example, lets a VAX-11 COBOL program send a record from a serial file to another COBOL program as soon as the first program is done with the record. In other COBOLs, a second program has to wait until the first has gone through the whole serial file, Hadley said.

But "what continually impresses me ... is our ability to effect change, which a batch shop just wouldn't permit you to do as quickly," Hadley says.

"You can modify a program, test the changes, and put them in much faster than you can in a batch environment. You don't have the in-

herent delays of a programmer scheduling a batch of test runs and then going from one function to another.

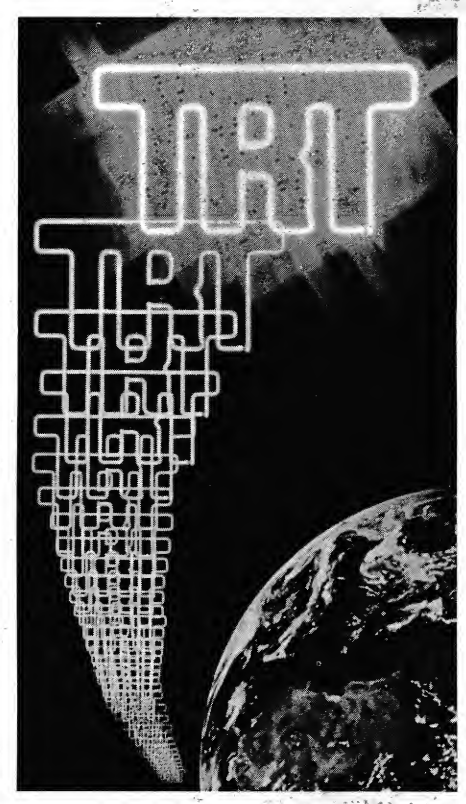
"Our programmers can compile, look at the results, test, and complete a task, right on-line. They can implement a system and test it very quickly, because they build it one step at a time. That's a tremendous advantage of VAX."

Because of VAX's addressing range, it's as easy to develop large COBOL programs on VAX as it traditionally has been to develop smaller programs on interactive minicomputers. Nor do TRT's four COBOL or six communications programmers have to worry about lack of capacity on the system, even if all ten use it at once, Hadley says.

TRT is an international telecommunications carrier that competes with Western Union International, ITT, RCA and other carriers for overseas telex, telegraph, leased channel and low- to high-speed data services. The U.S. government sets uniform rates for the carriers, so each has to win and hold customers on the basis of "good, consistent service and specialized reports and billing plans for clients," Hadley says.

TRT provides its full range of automatic switching services through several PDP-11/35 and PDP-11/70-based systems. Before acquiring its VAX-11/780, TRT collected the switching systems' billing data on tape and then transmitted this data to an IBM 370/148 for billing.

As its business grew, TRT decided it could preprocess the billing data



on VAX, which would both offload the 148 and reduce TRT's transmission and connect charges.

"One computer system could help us achieve two major goals," Hadley says. "We could consolidate all of our communications program development on one computer system, provided that system had good, interactive program development and sufficient performance for several programmers working at once.

"We wanted that same system to process our billing data in a satisfactory timeframe. That calls for just pure, large data throughput.

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"We looked at the VAX-11/780 right after it was announced. We could immediately see that it was right for the program development work."

Once TRT heard that native-mode COBOL was on the way, it decided on VAX. TRT's system currently has one megabyte of memory, three 176 Mb disks, five tape drives, and numerous CRT terminals.

TRT put its plans into effect quickly. The VAX system already handles all software development for TRT's switching systems, thus relieving them of all program development overhead except final testing.

All of this MACRO-11 and PDP-11 BASIC-PLUS-2 software runs in VAX's compatibility mode. The presence of an actual PDP-11 instruction set on VAX "is reassurance" that DIGITAL has a commitment to compatibility with its PDP-11s, Hadley says.

TRT plans a real-time transfer of billing and statistical data from each switching system to the VAX-11/780. A COBOL program in the VAX system will receive and process the arriving data and will provide both performance measurements and edit processing for the switching systems.

TRT plans to take advantage of the VAX-11/780's interactivity in several additional ways.

For example, "we've already developed a set of interactive COBOL programs through which management personnel can request any of several field selections, sorts, and reports generation. Following such an interactive session, these programs can cycle an entire day's data in less than 10 minutes."

Soon, when the VAX system's pre-processing programs detect an error (such as insufficient customer identification), TRT personnel will correct the errors on-line. This interactive error processing will eliminate for TRT the backlog inherent in a batch-oriented system.

Further, as TRT's network and switching facilities constantly change and expand to accommodate its rapid growth, subsequent table and program modifications will be effected with equal speed.

Dial a VAX Software Expert

Telephone Support Center Opens

As of October 1, 1979, North American customers who need immediate, expert advice regarding their VAX system's software can now telephone VAX specialists at DIGITAL's new Telephone Support Center (TSC) in Colorado Springs, Colorado.

The VAX specialists at the TSC average over seven years experience in the field, and are backed by local and corporate support groups trained in VAX technical functions and VAX software products. This high level of expertise helps them answer your questions quickly. If a VAX specialist is not immediately available when you telephone, you are guaranteed a return call from one within an hour.

This service is available to all customers who are in warranty or have a post-warranty service contract. Contact your local software services office to get details on how you may receive this service.

"Our goal is to make it easy for our customers to receive a fast, consistent response to software questions," says Bruno Dorr, manager of Software Services. "We're very excited about the worldwide Telephone Support Center concept and are confident that it will be responsive to our customers' needs."

Specialists are now available from 8:00 a.m. to 5:00 p.m. (Mountain time) Monday through Friday. Customers in Colorado, Hawaii, Alaska and Canada may call collect. All other customers may call toll-free during those hours. In 1980, 24 hour-a-day, 7 day-a-week coverage will be available. Plans are under way to establish Telephone Support Centers in Europe, Asia, and Australia.

Use of the Telephone Support Center is included under DIGITAL's new warranty policy, which covers DIGITAL-supported software for 90 days from the date of installation. Warranty coverage has been expanded to include not only the

operating system, but other dependent products, such as languages and utilities, running on VAX.

Updates made in software products, available during the warranty period, are delivered automatically, without additional charge. DIGITAL will also continue to provide installation service, on-site support, technical information, and Software Performance Reports.

Software product services extending beyond the warranty period range from comprehensive "DEC-support", which provides continuation of warranty-level support with visits for preventive maintenance, to a Binary Program Update Service for self-maintenance customers. New contract services cover major dependent software products as well as the VAX/VMS operating system.

New Tools Enhance VAX's User Writable Control Store

VAX's User Writable Control Store (UWCS) option enables sophisticated users to write microcode that will perform highly repetitive operations very quickly. New tools now make this easier to do.

The UWCS option has added a microassembler that assembles the user-written microcode; a loader that loads the assembled microcode into the UWCS; and a definition file that describes the characteristics of the VAX system to the microassembler. A documentation set is also included.

These tools will be shipped with all new orders for the UWCS option. Users of VAX systems that already have the UWCS hardware installed should order these new tools as soon as possible. There is no charge for this upgrade. Contact your sales representative for ordering information.

VAX Helps Find Energy Alternatives

One of the greatest challenges of the 1980's will be to turn the world's energy problems around and find practical solutions to our complex energy shortage.

Researchers at Thagard Oil, Irvine, California, are using a VAX-11/780 to study economically viable processes for coal gasification; conversion of municipal refuse, sewage or agricultural waste products to fuel; and extraction of energy from oil shale.

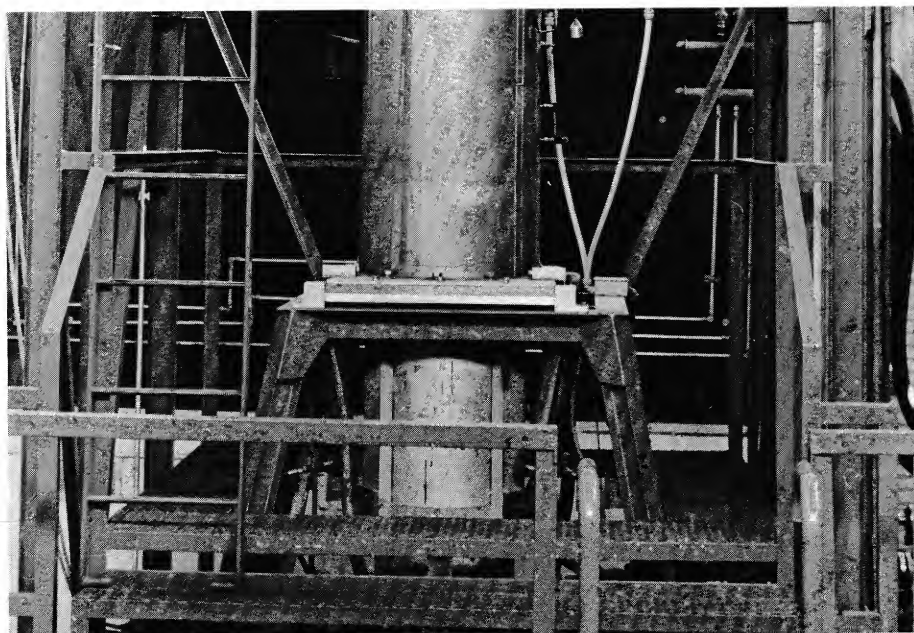
"The VAX-11/780 system lets us examine the complex processes of energy balances, flow processes and conversion principles," according to C.W. Service, researcher at Thagard Oil. It is being used together with a high temperature chemical reactor that consists of a porous refractory reaction tube heated by 480 volt, three phase electrodes in a highly efficient radiation shield that minimizes thermal losses.

Material passing through the central tube reaches temperatures in excess of 4000 degrees Fahrenheit, producing rapid thermal reactions. The thermal reactor uses infrared radiation rather than the conventional heat transfer by convection or conduction to achieve the temperature necessary for conversion.

Key to the process is a gaseous layer on the inside of the reaction tube that minimizes or eliminates contact of the feed stocks on reactor walls. By eliminating build-up, the process is continuous and does not require periodic shutdown for cleaning, a major problem associated with conventional high-temperature reactors.

"The VAX system lets us gather reactor data in real-time," Service says. "We can also explore scaling of reactor design and reactor operations to statistically examine the economic feasibility of various processes. By examining input energy, losses through the heat shield, output temperature and the energy required to dissociate materials, we can compute total closure, energy balances and reaction heating.

"For example, in coal gasification,"



Thagard Oil's thermal reactor works together with VAX to study energy economics.

Service explains, "the coal and water slurry produce hydrogen and carbon monoxide, a synthetic gas similar to the 'plant' gas manufactured in the early part of this century. There are, of course, additional reactions which can affect the energy economics of the processes. By examining energy balances we can determine what reactions occur and what their economic impact will be."

A DIGITAL MINC laboratory computer system collects data from the reactor in real-time, and using DIGITAL's DECnet network software, forwards it to a PDP-11/60, which compresses the data. The PDP-11/60 immediately sends the data on to the VAX-11/780, which then monitors the reactor and analyzes the processes within it.

The system produces summarized reports in graphic form on a four-pen 30 inch-per-second chrome plotter. The highly reduced data is ready for reports only hours after a day's experiments. Researchers can then focus on trends that may be important to the process.

How did Thagard researchers decide upon VAX to assist them in their analyses?

"We chose VAX for many reasons. Our most immediate need was to

find a computer that would provide us with very large working memory space. VAX not only gives us the memory we need now, but it will also meet our future requirements as we become further involved in reactor simulations. We won't outgrow it," Service says.

"Time is critical to our operation. Prior to VAX, calculations took an exorbitant amount of time to do. Some of the studies we are planning to do—studies of energy flows, heat shields, and chemical and energy balances in the reactor—were not viable before we purchased VAX. We now have enough memory and speed to do simulations of the reactor on-line in real-time."

"Before deciding upon VAX, we looked at several other computer systems. None of them came close to meeting our needs at a reasonable price," Service says. "VAX turned out to provide what we were looking for, and it was in our price range."

"For our application, VAX runs as a totally unattended system. It has been thoroughly reliable. So far, there have been no problems at all. We've had good luck with DIGITAL computers before, so for us, VAX turned out to be the best choice all around."

VAX Users and Developers Meet at Fall DECUS

Each fall and spring, DECUS, the Digital Equipment Computer Users' Society, convenes so that members can exchange ideas with fellow users and meet with DIGITAL developers and product managers.

DECUS is a voluntary, not-for-profit users' group supported in part by DIGITAL. It is the largest and most active users' group in the computer industry. The DECUS symposium on December 10-13 at the Town and Country Hotel in San Diego will include numerous sessions on VAX capabilities today and the direction of VAX in the future.

Following is a brief preview of the December symposium.

Sessions of Special Interest to VAX Users

VAX/VMS Special Interest Group (SIG) Introduction and Roadmap, the first VAX/VMS SIG Session for the Fall 1979 Symposium, is a good starting point at DECUS. The session will introduce members of the SIG steering committee and the speakers in VAX/VMS sessions; present an overview of VAX sessions; announce the VAX campground location where attendees can convene for technical and/or social discussions; and describe the VAX Demo area where users can meet developers for demonstrations of VAX and new VAX products.

The steering committee will describe SIG goals, current issues facing the VAX/VMS user community, and the agenda for the SIG business meeting. This session will be interactive, so come prepared to make yourself heard.

VAX System Panel will provide a product update of the VAX system. This session will be of primary interest to current VAX users. Developers will be available to answer questions of general interest.

VAX Reserved Session will focus on DIGITAL's commitment to VAX and address the long-term directions for enhancements. Of interest to current VAX users as well as those

considering a VAX system, this session will cover strategy rather than announcements of new products.

VAX Languages Q & A will provide an overview of the languages now supported on VAX/VMS, and will offer guidelines for selecting the language most appropriate for your application. Developers will be available to answer your specific questions.

VAX System Q & A gives you a first-hand opportunity to talk with a developer about how a certain system algorithm works or about the results of a system modification you have in mind. Audience questions will guide this session. Topics covered may include current VAX capabilities or discussion of anything in the released software.

Other Sessions of Interest to the VAX Community:

- VAX COBOL Programming Techniques
- VAX FORTRAN Optimizations
- VAX FORTRAN Release 2 Preview
- VAX/VMS Tuning and Program Optimization
- VAX/VMS Performance and Tuning
- Migrating from RSTS to VAX/VMS
- VAX/VMS Command Language Tutorial
- VAX DECnet Workshop
- VAX/VMS for Real-Time Applications
- VAX/VMS Support for MA780
- VAX/VMS Backup Futures
- VAX BASIC User Interface
- VAX BASIC Performance
- Forms Software for RSX-11M and VAX
- Screen Editing on VAX/VMS
- How to Write a VAX/VMS I/O Driver
- Writing VAX Modular Procedures
- VAX SORT Performance
- VAX Common Run Time Overview Q & A
- VAX Utilities Panel
- An Experimental Compiler for VAX

VAX SIG Sessions:

- VAX User Papers
- VAX SIG Newsletter
- VAX SIG System Improvement Requests
- VAX SIG Library
- VAX SIG Business Meeting
- VAX SIG Special Software Systems

Sessions of General Interest:

- RMS File Structures
- Software Warranty
- DATATRIEVE V2.0 Features
- RMS Optimization Workshop
- DECnet Product Performance
- BLISS
- Advanced DATATRIEVE V2.0 Workshop
- DIGITAL Diagnostic Center
- BLISS Language Tutorial
- LSI Development System for VAX
- Hybrid TECO

VAX Diagnostic Engineering Guide

A new VAX manual for diagnostic engineers is now available for use as a tutorial guide to diagnostic program development or as a reference for specific features of the diagnostic supervisor and diagnostic macro library.

The manual presents an overview of the VAX diagnostic philosophy and procedures and an explanation of how to write diagnostic programs for VAX family computers. This newest VAX hardware manual is written for diagnostic engineers who are familiar with the VAX-11 MACRO assembly language, VAX hardware, the VAX/VMS operating system, and the hardware device to be tested.

The VAX Diagnostic Engineering Guide is available from DIGITAL's Printing and Circulation Services group in Northboro, Mass. The order number is EK-1VAXD-TM001. Contact your local DIGITAL representative for additional ordering information.

New Self-Paced VAX COBOL Course Offers Convenience, Economy

DIGITAL is continually expanding its VAX courses to provide the best quality training for VAX customers. Twelve VAX Courses are presently offered to help users operate, program, or maintain their VAX system for their specific application.

Two recent advancements in the VAX training program include a new self-paced VAX/VMS COBOL Programmer Course and the offering of eight VAX lecture courses at DIGITAL's newest training center in Los Angeles.

The VAX/VMS COBOL Programmers Self-Paced Course gives commercial applications programmers the opportunity to learn the system-dependent features of VAX through the COBOL programming language. The use of

system features via the standard CALL statement is stressed.

The self-paced format allows users to work at their own pace, focusing on the information relevant to their specific tasks. Self-paced courses are especially economical and beneficial when a company wishes to teach several users the same material, or when new employees refer to the course over and over as they learn to use the system.

The course also covers use of VAX/VMS system services, VAX-11 SORT, condition handlers, and handling and sorting of ISAM files. Use of the interlanguage linkage, which allows the COBOL programmer to call routines written in other languages and to access procedures in the Common Run-Time

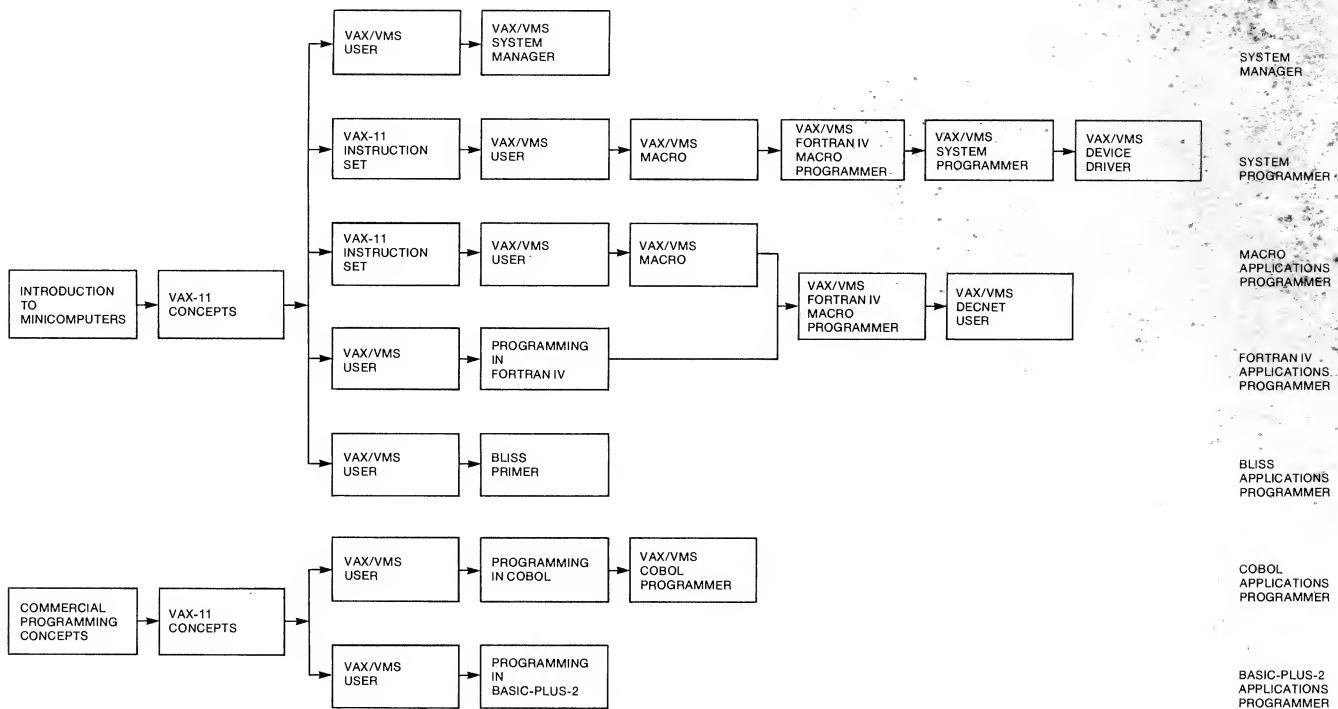
Library, is also emphasized.

The new Los Angeles Training Center now regularly offers eight VAX/VMS courses, including:

- VAX-11 Concepts—Audio/Visual and Lecture
- VAX-11 Instruction Set—Audio/Visual and Lecture
- VAX/VMS User
- VAX/VMS MACRO
- VAX/VMS FORTRAN/MACRO Programmer
- VAX/VMS System Programmer
- VAX/VMS Device Driver
- VAX/VMS System Manager

For further information about courses at other DIGITAL Training Centers, or on-site at your company location, please contact your local DIGITAL Sales Office.

VAX/VMS TRAINING



VAX Documentation— "First In Its Class"

DIGITAL has always operated on the theory that a software product is complete and ready for shipment only after the documentation, as well as the operating system, is tested and proven successful.

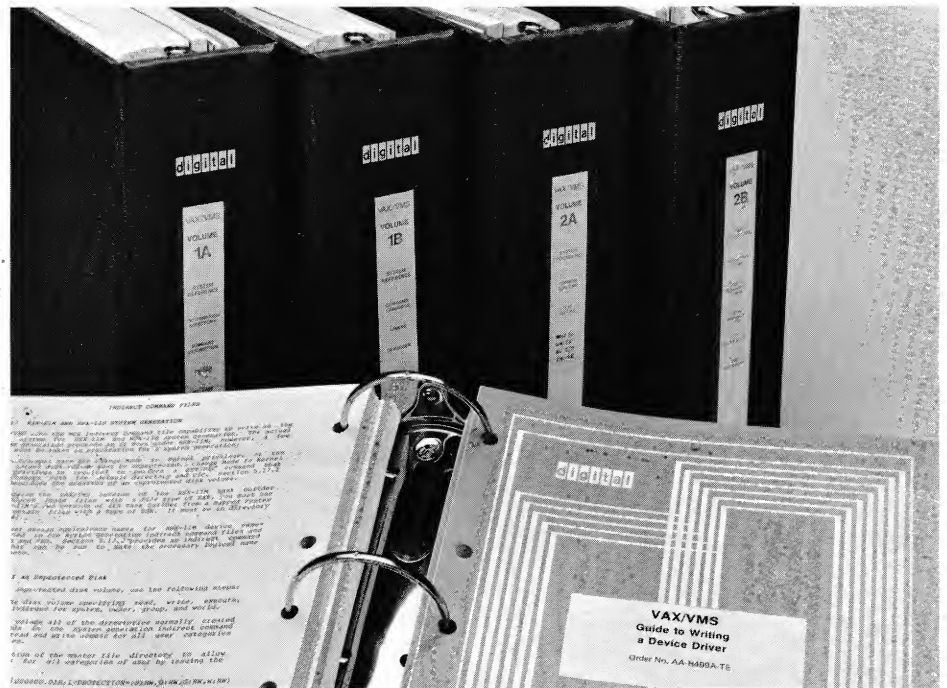
In the case of VAX, its extensive documentation set took more than two and one half years to develop, beginning from the early days when VAX was simply a concept, through its initial release in 1978. The documentation set is continually updated and revised to reflect VAX's current capabilities.

Public recognition for its high quality and thoroughness came with the winning of several "first place in its class" awards in the Society for Technical Communication's 1978-1979 Technical Publications Competition. Some of the publications that received acclaim include the VAX/VMS Primer, the VAX/VMS System Managers Guide, The VAX/VMS Command Language Users Guide, and the Introduction to VAX-11 Record Management.

The documentation provided with the VAX/VMS operating system consists of 33 books organized into seven volumes. The documentation covers all levels of users, from the new and inexperienced through the sophisticated development programmer. Additional documentation on optional products is also available.

The documentation set complements the VAX-11/780 Technical Summary, the VAX handbook set, and the VAX hardware manuals. All literature is updated as required to reflect new information or modifications.

"People with a minimum of programming experience have taken the documentation set and begun to operate and program the system on their own," a VAX documentation manager notes. "Part of this is due to the design of VAX itself... its human engineering. It all fits together and seems to make sense."



IMSL Subroutine Library Offered for VAX

A set of 458 mathematical and statistical subroutines is now available for VAX from the International Mathematical and Statistical Libraries, Inc.

The subroutines are written in FORTRAN and are designed to be used as "building blocks" in the development of scientific and engineering applications programs.

The subroutines are grouped into 17 chapters according to their function. The chapters in the Library include:

- Analysis of Variance
- Basic Statistics
- Categorized Data Analysis
- Differential Equations; Quadrature; Differentiation
- Eigensystem Analysis
- Forecasting; Econometrics; Time Series; Transforms
- Generation and Testing of Random Numbers
- Interpolation; Approximation; Smoothing

- Linear Algebraic Equations
- Mathematical and Statistical Special Functions
- Non-Parametric Statistics
- Observation Structure; Multivariate Statistics
- Regression Analysis
- Sampling
- Utility Functions
- Vector, Matrix Arithmetic
- Zeros and Extrema; Linear Programming

Documentation and support are provided. For subscribers, the source code on magnetic tape, a reference manual, maintenance, updates, and telephone consultation on library usage are included.

For further information, contact:
IMSL, Inc.
7500 Bellaire Blvd.
Houston, Texas 77036
U.S.A.

Since the products described above are those of other companies, and since DIGITAL has not analyzed, reviewed, or checked the quality of the products in any way, DIGITAL is not responsible for their performance or maintenance.

Three Statistical Packages Available For VAX

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The availability of three popular statistical packages on VAX makes the system even more attractive for educational and research applications.

SPSS—SPSS is a comprehensive, integrated system of powerful yet flexible and easy-to-use procedures for statistical analysis, tabulation, report writing, and general-purpose data management for the social sciences.

No programming experience is required to use SPSS. Control statements are in English syntax and output is both logically formatted and fully labeled.

SPSS's extensive data management facilities permit simplified handling of large file and subfile structures as well as recoding of existing variables, creation of new variables, and selection, sampling, or weighting of specific cases. The powerful new report generator can list cases, compute a wide range of summary statistics, and produce customized, camera-ready output.

Versions of SPSS are available for both the PDP-11 and VAX. Statistical capabilities include the following (not all capabilities available on both versions): Frequency Distributions; T-TESTS; BREAK-DOWN of aggregate data into subpopulations with one-way analysis of variance; AGGREGATION of subpopulations; N-WAY CROSSTABULATION; and MULTIPLE RESPONSE.

Also CORRELATION; PARTIAL CORRELATION; NONPARAMETRIC CORRELATION; MULTIPLE REGRESSION; N-WAY ANALYSIS of VARIANCE AND COVARIANCE; DISCRIMINANT ANALYSIS; FACTOR ANALYSIS; CANONICAL CORRELATION ANALYSIS; RELIABILITY; LIFE TABLE; NONPARAMETRIC TESTING; GUTTMAN SCALE ANALYSIS.

For more information on SPSS/VMS, contact:

SPSS, Inc.
444 North Michigan Ave.

Suite 3300
Chicago, Illinois 60611.
U.S.A.

BMDP—BMDP is a comprehensive set of 33 statistical programs converted from the original IBM 360/370 version developed by the Health Sciences Computing Facility at UCLA. The many analyses BMDP can perform on large or small data sets include data description and screening, visual displays, regression, analysis of variance, multivariate techniques, crosstable analysis, and nonparametric statistics.

Data transformation and editing is easily accomplished using either BMDP's built-in transformation language or the user's own FORTRAN subroutines, which are automatically linked to the BMDP program at run time. There is virtually no limit to the size or complexity of the analyses that BMDP can handle. Output can be directed to printer, terminal, or disk file at the user's option.

For more information on BMDP on VAX, contact:

Management Science Associates, Inc., 5100 Centre Avenue,
Pittsburgh, PA. 15232
U.S.A.

P-STAT 78—This is a large, interactive computing system for file maintenance, data display and statistical analysis. It can be used for purposes ranging from simple file handling and record-keeping to complex statistical operations such as stepwise regression and factor analysis. It is capable of serving an introductory sociology

class or a government census bureau.

The DATA program is the primary tool for creating a P-STAT system file. It is designed to detect and report any obvious errors in input, even to checking that records belong together.

Many files can be active during a single P-STAT run, which is often a flow from one file to the next. A typical run could include joining, subsetting, collating and sorting P-STAT files, combined with data modification, and perhaps computing some correlations, regressions, and crosstabulations.

Data may also be displayed in many different formats. The choices include frequency distributions, histograms, plots, and extensive crosstabulation facilities.

P-STAT is conversational in interactive mode. There are automatic screen-holding controls for use with CRT terminals, a free format data input program and an internal text editor.

With the implementation of the editor, P-STAT has become the first major social science statistical package that is both conversational and still contains all the statistical and file maintenance features available in batch mode.

For more information on P-STAT, contact:

P-STAT, Inc.
P.O. Box 285
Princeton, N.J. 08540
U.S.A.

Since the products described above are those of other companies, and since DIGITAL has not analyzed, reviewed, or checked the quality of the products in any way, DIGITAL is not responsible for their performance or maintenance.



The UETP: a Fast Way to Test a VAX System

What if you are eager to run a major application, but have just reconfigured your VAX system or recovered from a power failure?

That's when you can turn to the VAX/VMS UETP to determine, in a matter of minutes, if your VAX system is in good working order.

The UETP is a collection of tests that exercise most of a VAX system's hardware and software components, much as if they were being used in a normal timesharing environment. The tests not only show that individual components work, but also that the components work together as an integrated system.

This is the same test DIGITAL uses at the conclusion of a VAX system's final assembly and test, and at its installation at a customer site.

The UETP is not a diagnostic and does not replace diagnostic tests. Instead, the UETP exercises devices and functions which are common to all VAX systems, and also tests many of the optional software products.

For example, the UETP exercises all standard line printers, terminals, magnetic tapes and disks connected to a VAX system, as well as all native-mode system services, record management services, and utilities. It also tests most RSX-11M operating system utilities, which run in compatibility mode on VAX/VMS.

In the process of running these tests, the UETP indirectly tests additional functions of the system. The system manager runs the UETP interactively from a terminal. When the UETP package encounters an error, it returns an error message and proceeds.

If the UETP encounters an error that you cannot immediately diagnose, you can turn to the VAX/VMS error logging and diagnostic facilities, which will produce a detailed report of hardware and system errors that occurred while the UETP was running. DIGITAL field service can use that information to quickly resolve the difficulty.

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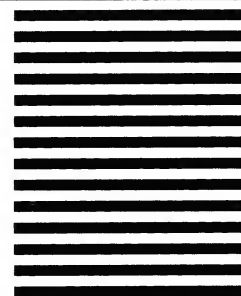
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New Design and Analysis Programs

Engineering programs traditionally have had to run on large mainframe computers. Since the advent of the VAX-11/780, this is no longer the case. At a far lower price, VAX can provide mainframe performance, plus interactive graphics for data preparation and post-processing analysis.

Several new products have joined the extensive list of engineering software available on VAX:

AD-2000—This package, a product of Manufacturing and Consulting Services, Inc. (Costa Mesa, California), is considered the state of the art in computer-aided design applications. It enables engineers to dynamically create and manipulate design representations of two- and three-dimensional structures from original concept to product creation.

AD-2000 contains five basic modules: basic geometry, extended geometry, geometric analysis, mechanical drafting, and numerical control. The package develops and maintains continuous geometric data bases, making it possible to archive and retrieve parts and families of parts for modification and redevelopment. A set of APT language commands is produced

from this data base, representing the tool path needed to manufacture the designed part.

AD-2000 can interface with existing user software. Interfaces that either exist or can be generated include cadastral mapping, electronic design/drafting, finite element modeling, 2-D nesting, 3-D nesting, 3-D packaging, sheet metal bending, piping layout, and utility management.

FEMGEN—FEMGEN (Finite Element Mesh Generator) is a popular European finite element pre-processor that supports many different finite element packages, including ASKA, NASTRAN, STARDYNE, and ASAS.

PAFEC 75—PAFEC supports a sizeable library of generally applicable finite elements that can be used to solve a range of engineering problems under a variety of load conditions. Analysis options include linear statics, plasticity, creep, natural frequencies, steady state and transient heat transfer, transient response, and certain cases of large displacements.

TPS-10—TPS-10 is a general purpose finite element analysis program that is used to solve problems

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9 Please send me:

- ☐ VAX-11/780 Brochure
☐ VAX-11/780 Technical Summary

Name _____

Title _____

Company _____

Address _____

City _____

State or Country _____

My primary application area is:

- | | | |
|--------------------------------------|-------------------------------------|--|
| ☐ Education | ☐ Laboratory | ☐ Industrial |
| ☐ Engineering | ☐ Medical | ☐ Telephone/Utilities |
| ☐ Government | ☐ Resale | ☐ Other |

☐ I would like to receive VAX NEWS.

Design and Analysis *continued*

of linear statics, large displacements, dynamic response, heat transfer, and acoustics. Substructure analysis may also be performed in conjunction with structural, heat transfer, and acoustics problems.

ANSYS—ANSYS is a widely used large-scale general purpose engineering analysis program that uses the finite element technique to solve many classes of engineering problems. These include problems

of heat transfer, dynamics, and plasticity. It was developed and is maintained by Swanson Analysis Systems, Houston, Pa. U.S.A., and runs on a variety of mainframes. Recent enhancements to ANSYS make it especially suitable to solving problems that are peculiar to the design of off-shore oil platforms.

ADLPIPE/DIS—Arthur D. Little's (Cambridge, Ma. U.S.A.) piping analysis program is heavily used by

the petrochemical, nuclear, and shipbuilding industries.

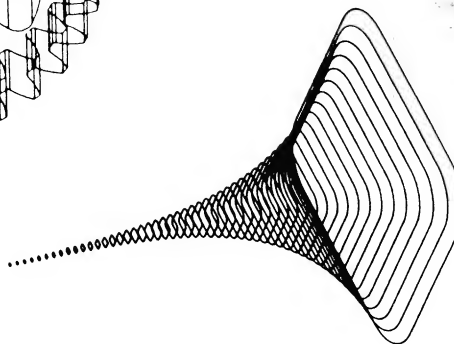
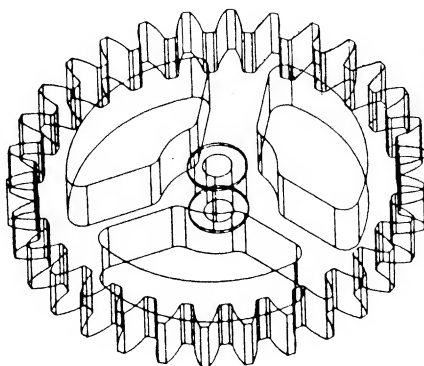
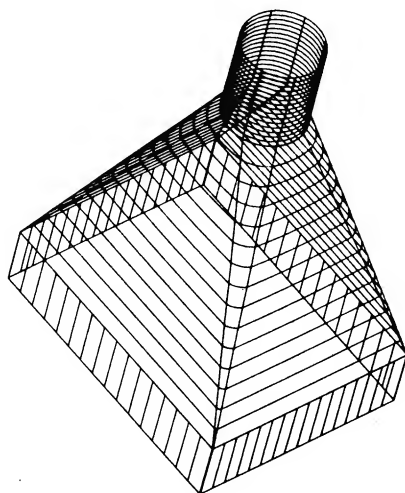
DIS (Design Information System) is a new addition to ADLPIPE software. It provides information management assistance to complex piping designs.

TEGAS is a Test Generation And Simulation package for the digital electronics inside integrated circuits (ICs) and on printed circuit boards (PCBs). It is a product of Comprehensive Computing Systems and Services, Austin, Texas, U.S.A.

TEGAS is a tool that can help automate both the time-honored methods of breadboarding for design verification and manual labor for test pattern generation. The labor savings can amount to thousands of dollars, and the reduction in product time-to-market can be just as significant.

For information about any of these products, contact your local DIGITAL Engineering Systems Group representative, or Janet Gauvin at Digital Equipment, 200 Forest St., Marlboro, Massachusetts 01752 U.S.A.

Since the products described above are those of other companies, and since DIGITAL has not analyzed, reviewed, or checked the quality of the products in any way, DIGITAL is not responsible for their performance or maintenance.



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